**Testing the RFID Chip**

The RFID chip testing has the following goals:

* Measure energy of RNG, NVRAM, encryption logic block
* Verify functionality of the various blocks

The inputs are given to the chip in one of the following manners depending on the input:

* Scan chain. This is the most common input form:
  + For Static settings
  + Address for memory while writing to the memory
* Direct inputs
  + Data for memory while writing to the memory
  + All resets for the various blocks
  + External clocks
  + External RNG
  + Analog VCO voltages

Outputs can be seen by setting output mux select bits (S0-3) such that you get the signals you want to see. At a time, you can only see 5 nets.

Top level procedure:

1. Scan in the static settings to enable writing to the memory externally
2. Write to the memory
3. Scan in the static settings to disable external writing, and make the encryption logic as the controller for the memory
4. Tell the encryption logic to start

Detailed steps (these are implemented in the top level sim at /net/plato.ee.Virginia.EDU/scratch/sk4fs/workarea/adesto/top\_level\_w\_pads/filename\_tran.scs)

1. Apply 0.4 V at all power pins (except 0.6V at VCC) and 0 at VSS
2. Apply analog voltages at all VCO inputs
3. Reset all blocks
4. Set the output mux select bit to the signal you want to see
5. Make RD\_EXT=1
6. Give clock input at EXT\_CLK
7. Setup scan input to correct vector
8. Un-reset the scan registers. Then enable the scan enable for static settings. This will setup the memory to be written.
9. Disable the scan enable for static settings.
10. Make START = 1. This will start all the VCOs.
11. Setup the scan input for address to be written, and give data at external data input
12. Enable the scan enable for address. This will setup the memory address for writing. Once the first address is written into the scan registers, disable the scan enable for address.
13. Unreset the memory
14. Toggle RD\_EXT = 0 for a few cycles. Simultaneously, make VWL = 0.6V. This will write the data to the address provided
15. Toggle RD\_EXT = 1. Simultaneously, make VWL = 0.4V.
16. Repeat steps 9-13 for all addresses for the memory. This will write the entire memory to the data needed.
17. Unreset the encryption logic and that would start the encryption.
18. Throughout this process, you can see the outputs you want by simple setting values to output mux select bits.